

Abstract of the Disclosure

Systems and methods for the *ex vivo* diagnostic analysis of samples of bodily fluids, including exhaled breath and blood. The present invention uses nanostructure-based assemblies in combination with sensor technology to provide an efficient and accurate means for identifying the presence of a target analyte/biomarker in a sample of bodily fluid. In a preferred embodiment, the nanostructure-based assemblies of the present invention include detecting means such as RNA oligonucleotide chains or "aptamers" and releasable surrogate markers such as DMSO.